

AMENDMENTS TO THE SPECIFICATION:

Page 1, lines 5-11, amend the paragraph as:

The present invention relates to an evacuated glass panel and a method of fixing support means between two planar glass sheets of the evacuated glass panel. The method can be employed for manufacturing high thermo and sound insulating glass panels with improved quality and better yield. ~~disposed therein, particularly, a method of fixing support means, disposed therein, which is convenient to large-scale production and able to increase the productivity of evacuated glass panel, and said method can employed for manufacturing high thermo and sound insulating glass panel.~~

~~The present invention concerns the technical field of glass manufacturing~~

Page 1, lines 13-18, amend the paragraph as:

The well-known evacuated (vacuumized) glass panel generally includes two or more planar glass sheets, Due ~~due~~ to the evacuated state between planar glass sheets, ~~the~~ heat can not be transferred by convection ~~manner~~, and at the same time an effective barrier for sound transfer is formed. ~~generated, such,~~ The evacuated glass panel is also referred to as high thermo and sound-insulating evacuated glass panes.

Page 1, line 19 to page 2, line 6, amend the paragraph as:

Because of the evacuated state between planar ~~planer~~ glass sheets and the atmospherical pressure effecting effect on the outer surface of a planar glass sheet, it is possible to cause opposite deformation of planar glass sheets in the evacuated glass panel ~~sheets in evacuated glass planar~~ and even fracture of the glass sheets. Therefore, during

~~manufactured the manufacturing~~ process of evacuated glass ~~planar~~ panels, a plurality of support means[,] to be disposed between planar glass sheets are always used. ~~The , and make the~~ distribution of ~~the~~ disposed support means has to be as uniform as possible[,] ~~so that as~~ to resist the atmospherical pressure on planar glass sheets, and thus maintain the shape of ~~the~~ planar glass sheet ~~not easy to deform and rupture to avoid being easily deformed and ruptured.~~

Page 2, lines 7-14, amend the paragraph as:

The problem, ~~resulted results~~ from disposing support means within the evacuated glass panel ~~is: the influence on~~ is the reduction in the transmissivity of an evacuated glass panel and, particularly, a color-less transparent evacuated glass panel. ~~When , when~~ the support means has a large cross section, it not only ~~reduces the~~ has influence on transmissivity of ~~the~~ evacuated glass ~~planar, but panel but also~~ makes it short ~~short~~ of an esthetic sense. ~~Therefore, therefore,~~ a solution of ~~the said~~ problem is to use transparent glass support means of a smaller size. However, this method leads to certain difficulty in manufacturing evacuated glass panels.

Page 2, line 15 to page 3, line 4, amend the paragraph as:

In order to dispose support means between glass sheets of an evacuated glass panel, ~~an operation of a process for~~ placement of ~~the~~ support means is if needed. ~~If Due to~~ support means of a smaller cross section is used, ~~so~~ a great number of support means is necessary to support the glass sheets. ~~This place, this~~ is true specially during manufacturing large size evacuated glass panels. At the time of placing support means, because a large number of support means is needed and ~~need to place, moreover,~~ the two

~~ends bottoms~~ of ~~the~~ support means may be not parallel, the surface of ~~the~~ planar glass sheet ~~becomes~~ ~~commonly~~ not very even and the height between support means has difference. ~~As a result, so that~~ the support means[[,]] disposed on ~~the~~ planar glass sheet is easy to turn down. ~~When ,specially;~~ the planar glass sheet, on which ~~the~~ support means are disposed, needs to be moved, the possibility of ~~the~~ support means to turn down is increased.

Page 3, lines 5-18, amend the paragraph as:

Besides, due to the difference of ~~the~~ height between support means, after ~~completion of~~ manufacturing ~~the~~ evacuated glass panel, some support means[[,]] having lower height ~~is able to be~~ can be easily moved. ~~In particular, particularly,~~ during vertical assembling of the evacuated glass panel, the support means is easy to fall off under ~~its~~ gravity. ~~The ,the~~ fall off ~~regarding to~~ of some support means leads to non-uniform support force on ~~the~~ planar glass sheet and, under atomspherical pressure, the planar glass sheet is easy to deform with ~~receptively~~ increased inner stress. ~~Therefore,~~ the evacuated glass panel is prone to be ~~trend toward~~ fractured during accidental collision[[,]] even if the external force is very low. It is appreciated[[,]] from above-mentioned, the problem of turn-down and fall off regarding ~~to~~ ~~the~~ support means not only impacts the yield ~~exert a tremendous influence on productivity of~~ manufacturing evacuated glass panels, but also degrades the ~~on-service~~ quality of finished evacuated glass panels. Therefore, ~~therefore,~~ such a problem must be resolved as fast as possible.

Page 3, line 20 to page 4, line 6, amend the paragraph as:

The main object of the present invention is to provide a method of fixing the

~~support means disposed within an evacuated glass panel to solve ,regarding to the~~
~~problem of turn down and fall off of the support means. The ,to provide a method of~~
~~fixing, support means, disposed within an evacuated glass panel, use proposed fixing~~
~~method of the invention makes small support means can be stably placed on the planar~~
~~glass sheets of a sheet, included in said high thermo and sound-insulating glass panel,~~
~~Even ,even if the planar glass sheet is moved or the finished evacuated glass panel is~~
~~vertically assembled, no turn down and fall off of support means will occur and, therefore,~~
~~so that the productivity of evacuated glass panels is increased and the quality of the~~
~~finished evacuated glass panel is increased improved.~~

Page 4, lines 7-11, amend the paragraph as:

The secondary object of the present invention is to provide a specific functional layer on the inner surface of the evacuated glass panel manufactured by the [[a]] method of fixing support means[[,]] disposed within evacuated glass panel according to the invention for wider applications. ~~paned, use proposed fixing method makes manufactured evacuated glass panel obtain a specific functional layer on its inner surface, thus resulting more wide application.~~

Page 4, lines 12-16, amend the paragraph as:

The further object of the present invention is to provide an evacuated glass panel[[,]] having support means[[,]] disposed therein according to the proposed fixing method with ,said evacuated glass panel has not only good high thermo and sound-insulation property[[,]] but also good mechanical strength and specific applicable functions.

Page 4, cancel lines 17-18.

Page 4, lines 19-22, amend the paragraph as:

~~According to the invention, A method of fixing support means within evacuated glass panel, said the~~ evacuated glass panel includes at least two planar glass sheets, ~~having any shape and support means[[,]] disposed therein. The method of fixing support means comprises , characterized in that said method comprising~~ at least the following steps, ~~of:~~

Page 5, lines 1-3, amend the paragraph as:

At first ~~apply~~ a solution layer is applied on the surface of the planar glass sheet[[,]] on which the support means are disposed, ~~secondly, place~~ and then the support means are placed on said solution layer.[:,:]

Page 5, lines 4-11, amend the paragraph as:

~~The At last, cover the~~ upper surface of the support means is covered with a planar glass sheet, and ~~heat-said the~~ solution layer is heated to dry[[,]] so as to fix the said support means between the planar glass sheets. ~~Said The~~ solution layer entirely or partly covers the ~~or-locates~~ planar glass sheet's surface[[,]] on which the support means is disposed in order to manufacture ~~manufacturing~~ evacuated glass panels[[,]] having various specific functions. ~~Said The~~ planar glass sheet, on which support means is disposed, is a top planar glass sheet or an intermediate planar glass sheet. ~~Said The~~ heating method is [[a]] oven drying or sintering.

Page 5, line 12 to page 6, line 1, amend the paragraph as:

An evacuated glass panel according to this invention comprises invention,
~~comprising:~~ a top planar glass sheet, a bottom planar glass sheet, support means and a
seal component around the periphery of the planar glass sheets. ~~The ,~~characterized in
that, said support ~~and bottom planar glass sheets;~~ said support means are adhered to the
surface of the bottom planar glass sheet through a residual solution layer. ~~The ,~~the cavity
between top and bottom planar glass sheets is an evacuated space. ~~Said~~ Each support
means is a solid or hollow pillar. ~~The said hollow pillar has an~~ opened penetrated portion
at its side or top surface[.,,] for communication of the space between planar glass sheets
with the inner cavity of the hollow pillar. ~~Said support means is more than two on top~~
~~planar glass sheet, and uniformly disposed on surface of bottom planar glass sheet or on~~
~~upper surface of top planar glass sheet. For an evacuated glass panel having more than~~
~~two planar glass sheets, support means is also adhered to the upper surface of the top~~
~~planar glass sheet. The support means comprises a plurality of support members~~
~~uniformly distributed on the upper surface of the bottom planar glass sheet or the upper~~
~~surface of the top planar glass sheet.~~

Page 6, lines 2-10, amend the paragraph as:

The ~~Said~~ residual solution layer is an adherent layer formed after volatilization of
an organic or non-organic solution during glass manufacturing process. ~~The ,~~ said
adherent layer entirely or partly covers ~~or locates~~ the upper surface of the bottom planar
glass sheet or the upper surface of the top ~~tip~~ planar glass sheet. ~~The~~ Said sealing
component is used to vertically seal and joint the ~~to~~ edge frame component around the
periphery of the planar glass sheet. ~~The ,~~ said edge frame component seals and joints with

~~through sintering melt the low melting point glass powers, applied on its inner side, and after cooling seal and join to the periphery of the said planar glass sheets after the low melting point glass powders, which are applied on the inner side of the edge frame component, are processed through sintering and cooling.~~

Page 6, lines 11-18, amend the paragraph as:

With regard to the shortcomings shortages of the prior evacuated glass panels in the prior art, the present invention proposes[[:]] a method of placing the support means on the surface of a planar glass sheet through adhesion at the process of glass manufacturing. Using the ,using said method, it can maintain uniform force received by the receiving of planar glass sheet on one hand, and resolve the problem of movement of support means within the evacuated glass panel on the other hand, resulting in a good quality level for the evacuated glass panel. ~~The present invention has following advantages:~~

Page 6, lines 19-22, amend the paragraph as:

Using the said method described in the present invention for placing support means in an evacuated glass panel, ~~because~~ the immersion and surface tension effect of liquid[[:]] prevents the support means from being can-not-be moved at successive operations; manufacturing steps. Therefore, the manufacturing process is simplified, cost is reduced and operating effectiveness is increased. ~~so as to simplify operation, reduce cost and increase operating effectiveness.~~

Page 7, lines 1-20, amend the paragraph as:

using said method for placing support means in evacuated glass, through heating operation in manufacturing process of evacuated glass panel, due to presence of residual matter of organic solution, as well as non-volatilizable matter of non-organic material, specially, at periphery around the end of support means, due to surface tension of liquid, the residual matter is collected relatively more, therefore, said method has following advantages: because the hardness of residual matter is far lower than that of support means or glass, so a buffering layer is formed, thereby increasing the mechanical strength of evacuated glass panel and overcoming the problem identified by non-uniform stress due to the difference of support means, generated in compression process of evacuated glass panel; the residual matter adheres support means and planar glass sheets together, without occurrence of movement of support means; if solution material having higher infrared reflecting ability is used, the manufactured glass panel will be effective to reduce thermal conductivity. Using high thermo and sound insulating evacuated glass panel made by said method, overcomes the disadvantage due to difference of support means and movement thereof, thereby increasing the mechanical strength and practical applicability of evacuated glass panel

Because of the presence of the residual organic solution and the non-volatilizable matter of non-organic materials, relatively more residual matter is collected at the periphery around the ends of the support means through heating operation in the manufacturing process of the evacuated glass panel due to surface tension of liquid. Therefore, the method of the invention has the following advantages. A buffering layer is formed and the hardness of the residual matter in the buffering layer is far lower than that

of the support means or glass, thereby increasing the mechanical strength of the evacuated glass panel and overcoming the problem caused by non-uniform stress generated in the compression process due to the height difference among the support means. The residual matter also adheres support means and the planar glass sheets together to avoid the movement of the support means. If the solution layer has a higher infrared reflecting property, the manufactured glass panel is also effective in reducing thermal conductivity.

Page 7, line 22 to page 8 line 10, amend the paragraph as:

Fig. 1 ~~Fig.1~~ is a schematic cross sectional view of an embodiment in which the bottom planar glass sheet is covered with a ~~with covered~~ rosin spirit solution layer according to this invention;

Fig. 2 ~~Fig.2~~ is a schematic cross sectional view of the embodiment in Fig. 1 ~~Fig.1~~ after ~~completion of manufacture~~ the evacuated glass panel is manufactured;

Fig. 3 ~~Fig.3~~ is a schematic cross sectional view of an embodiment having three planar glass sheets in which the bottom planar glass sheet and the intermediate planar glass sheet are covered with a ~~with covered~~ solution layer according to this invention;

Fig. 4 ~~Fig.4~~ is a schematic cross sectional view of the embodiment in Fig. 3 ~~Fig.3~~ after ~~completion of manufacture~~ the evacuated glass panel is manufactured;

Fig. 5 ~~Fig.5~~ is schematic cross sectional view of an embodiment in which the bottom planar glass sheet is covered with a ~~with~~ tin chloride solution; and

Fig. 6 ~~Fig.6~~ is a schematic cross sectional view of the embodiment in Fig. 5 ~~Fig.5~~ after

~~completion of manufacture~~ the evacuated glass panel is manufactured.

Page 8, line 15 to page 9, line 1, amend the paragraph as:

As shown in Fig. 1 this embodiment according to the present invention uses a rosin spirit solution for adhering support means. The evacuated glass panel ~~comprising:~~ comprises a top planar glass ~~sheet 1 sheet~~ and a bottom planar glass sheet 2. A layer of an organic rosin spirit solution 5 is rolled on the ~~at~~ surface of bottom planar glass sheet 2, ~~a layer of organic rosin spirit solution 5 is entirely rolled on;~~ A plurality of transparent glass pillars with penetrated holes 41 is the support means 4 between two planar glass sheets, support means 4 is in form of transparent glass pillar with penetrated hole 41; at periphery around planar glass sheet a A glass seal component 6 is placed at periphery around the planar glass sheets. The ~~manufacturing~~ manufactured process of ~~the said~~ evacuated glass panel ~~including~~ includes the following steps,[[:]]

Page 9, lines 2-17, amend the paragraph as:

At first ~~apply~~ a layer of an organic rosin spirit solution is rolled on the entire surface of bottom planar glass sheet 2 ~~by way of entirely rolled on, secondly, and then~~ uniformly place support means 4 are uniformly placed ~~as required~~ on the surface of bottom planar glass sheet 2 as required, ~~due to the immersion and surface of bottom planar glass sheet2, due~~ Due to the immersion and surface tension effect of liquid, the support means 4 is not easily ~~easy to be moved~~. As ~~shown~~ show in Fig2 Fig. 2, at successive operations processes of manufacturing the evacuated glass ~~manufacture~~ panel, a glass seal component 6 ~~component6~~ is sealed and joined ~~joined~~ on periphery around the planar glass sheets through sintering. At the end of the manufacturing ~~said~~

~~manufacturer process, because of the higher temperature of seal and join used for sealing and jointing~~ (i.e. 400°C), the rosin spirit solution 5 is dried. ~~Furthermore, moreover,~~ during evacuation of air from intermediate layers between planar glass sheets, the volatilized vapor of ~~the~~ rosin spirit solution is extracted ~~bled~~ out by evacuation. Because rosin spirit solution 5 is able to leave a residual layer 7 ~~layer7~~ at ~~the~~ process of drying, specially, at periphery around the end of support means 4 ~~means4~~ due to surface tension of liquid, ~~the~~ relatively more residual matter is collected ~~relatively more~~.

Page 9, line 18 to page 10, line 2, amend the paragraph as:

Moreover, because the hardness of residual layer 7 is far lower than that of support means or glass, ~~so~~ a buffering layer is formed, thereby increasing the mechanical strength of ~~the~~ evacuated glass panel and overcoming ~~over-coming~~ the problem caused identified by non-uniform stress in glass due to height difference among the support means 4. In the resulted form difference of support means4 in compression process of assembling the evacuated glass support means and planar glass sheets together, ~~without occurrence of the~~ movement of support means 4 is avoided.

Page 10, lines 4-6, amend the paragraph as:

As shown in Figs. 3 and 4, ~~Fig 3,4~~ this embodiment according to the present invention uses a solution layer for adhering support means in manufacturing ~~a vacuum glass panel, having 3~~ an evacuated glass panel having three planar glass sheets.

Page 10, lines 7-13, amend the paragraph as:

The hollow three-layer evacuated glass panel comprises a ~~comprising:~~ top planar

glass sheet 1a, an intermediate planar glass sheet 3, and a bottom planar glass sheet 2a. A layer of an indium oxide water solution is rolled on the entire upper surfaces of the intermediate planar glass sheet 3 and the bottom planar glass sheet 2a. A plurality of a layer of indium oxide water solution 5a is entirely rolled on, between three layer of planar glass sheets solid main support means 4a are disposed between two adjacent planar glass sheets, and a glass seal component 6a is placed at periphery around the planar glass sheet a glass seal component 6a is placed sheets.

Page 10, lines 14-21, amend the paragraph as:

The manufacturing ~~manufacture~~ process of the said evacuated glass panel in the invention includes the ~~including~~ following steps: ~~steps~~. At first apply a layer of indium oxide solution 5a is rolled on the entire surface of bottom planar glass sheet 2a and the entire surface of intermediate planar glass sheet 3, by way of entirely rolled on, secondly, ~~place support means 4a~~ Support means 4 are placed on the surfaces of the intermediate planar glass sheet 3 and the bottom planar glass sheet 2a as required ~~on surface of immediate planar glass sheet 3 and bottom planar glass sheet 2a~~ above the solution layer 5a, and at last, slightly compress said the three layers of planar glass sheets and are slightly compressed to carry out the following successive sintering operation.

Page 10, line 22 to page 11, line 4, amend the paragraph as:

In this said embodiment, the effect of the indium oxide solution is similar to that of the organic rosin spirit solution in example 1, and after sintering the residual layer 7a gives a good adhering effect on support means 4a. During production or practical assembly, the support means cannot be moved or fall off.

Page 11, cancel the paragraph in lined 5-6.

Page 11, line 8 to page 12, line 6, amend the paragraph as:

As shown in ~~Fig 5,6~~ Figs. 5 and 6, this embodiment according to the present invention uses a tin chloride solution layer for adhering support means. ~~Said~~ The embodiment is an evacuated glass panel, comprising top planar glass sheet 1b and bottom planar glass sheet 2b. The ~~the~~ upper surface of bottom planar glass sheet 2b is entirely covered by a layer of tin chloride solution 5b[;]] and support means 4b are disposed between two planar glass sheets. The a support means 4b is disposed; said support means 4b is a hollow glass pillar 4b with penetrated notch 41b, and the space between the two planar glass sheets is communicated through the said penetrated notch ~~the space between planar glass sheets is communicated~~ with the inner cavity of the support means, thereby ensuring an evacuated state within the support means after evacuation of the space between the two planar glass sheets. At the periphery around ~~planar~~ the planar glass sheets, a glass sheet metal seal component 6b is disposed. During a ~~during~~ sintering process, the low melting point glass powder layer placed on the inner side of the metal seal component 6b is ~~melted and after~~ sintered and solidified on the periphery of the planar glass sheets and the inner portion around the periphery of the said metal seal component 6b and planar glass sheet, realizing the sealing of the evacuated glass panel. In the said glass panel manufacturing ~~manufacture~~ process the effect of the tin chloride solution is similar to that of above example 1, and further description is omitted. It ~~it~~ should be noted[;]] that after sintering operation the layer of tin chloride solution 5b ~~became~~ becomes a residual layer of tin chloride [[6c]] 7b, which, said residual layer of

~~tin chloride 6c~~ in addition to adhering and fixing effect ~~the support means 4b~~, covers ~~the~~ surface of bottom planar glass sheet 2b.

Page 12, lines 7-18, amend the paragraph as:

Because of good infrared reflecting and electric conducting effects of the residual tin oxide layer ~~[[6c]] 7b which result in ,leading to~~ effective reduction of thermo conductivity of glass, ~~said the~~ two layer evacuated glass panel after evacuation will have better ~~high~~ thermo and sound-insulating ability~~[[,]]~~ as well as good electric conductivity, and thereby ~~[[a]]~~ wide applications. At last, it should be noted~~[[,]]~~ that above-mentioned embodiments are employed only for description of the technical schemes of the present invention and should not be limited thereon. Although ~~,although~~ the present invention has been ~~detailed~~ described in detail, it should be apparent to those of ordinary skilled in the art that modifications and variations may be made without departing from the spirit and scope of the technical schemes of the present invention, ~~at~~ and they should be included within the scope of appended claims.